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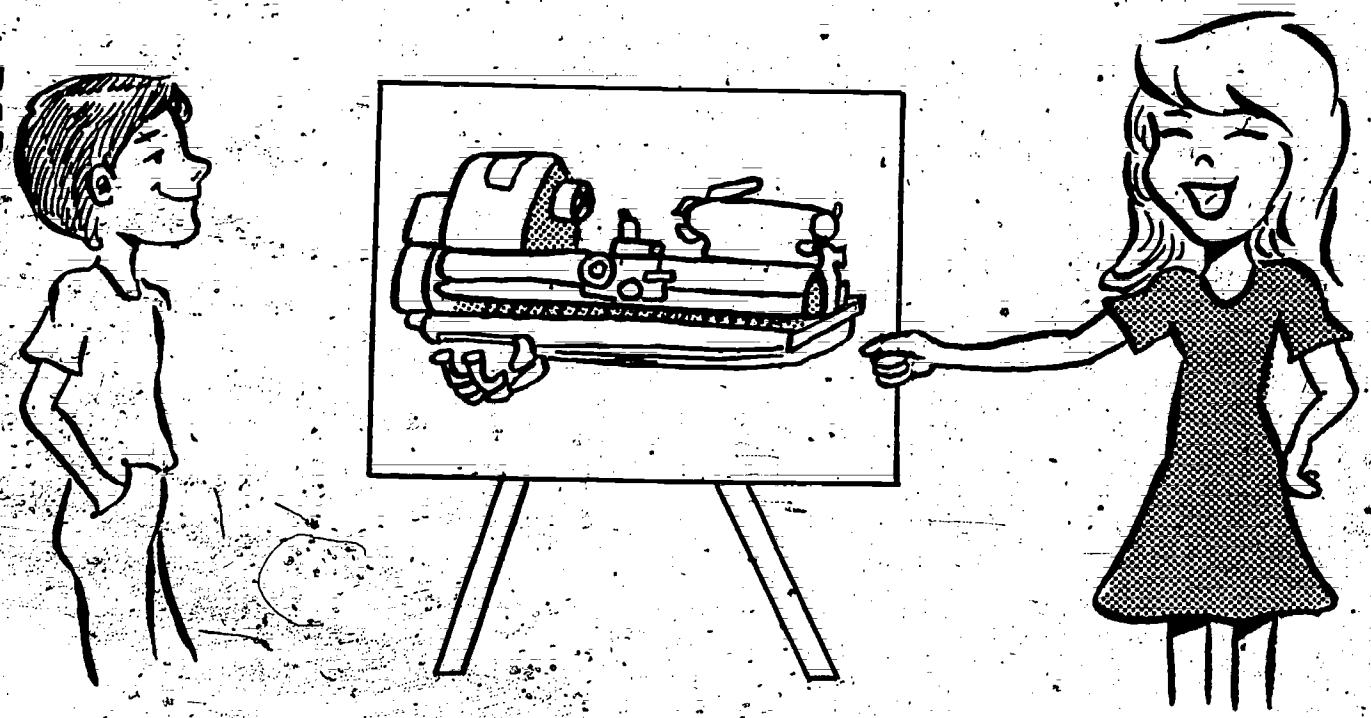
IDENTIFIERS Sketching

ABSTRACT

This curriculum guide, one of 15 volumes written for field test use with educationally disadvantaged industrial education students needing additional instruction in the basic skill areas, deals with helping students develop basic verbal and visual communication skills while studying metalworking. Addressed in the individual units of the guide are the following topics: learning to sketch straight, curved, and irregular lines in the metal shop; learning the names of tools; knowing the parts of a lathe; demonstrating machine operations to the instructor; and making a model. Each unit contains some or all of the following: a discussion of the major concepts of the technique being covered, instructions to the teacher concerning the use of the given technique, suggested related activities, student instructions, a student assignment, supplemental activities, and one or more worksheets. A basic skills checklist and a basic skills verification form are also provided to assist teachers in identifying those students who require additional help with basic skills. (MN)

# "LEARNING TO VERBALLY & VISUALLY COMMUNICATE THE METALWORKING WAY"



DEVELOPED BY

THE EDUCATIONALLY DISADVANTAGED COMMITTEE

INDUSTRIAL EDUCATION INSERVICE PROJECT

in cooperation with

The California State Department of Education

Office of Vocational Education
Field Operations Section
Industrial Education Unit

and

California State University - Los Angeles
Industrial Studies Department

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# Table of Contents



## Instructional Techniques

# INTRODUCTION

These instructional techniques were developed for those industrial education students who demonstrate a need for additional instruction in the areas of reading, writing, math, verbal and visual communication. They were written by industrial education teachers with a particular emphasis upon teaching a basic skill while retaining a major focus on the subject areas of auto, woods, metals, electronics, and drafting.

Each of these instructional techniques were written using the same format and with guidance from an expert in the areas of reading, writing, math, verbal and visual communication.

In order to help you identify those students who require additional help with the basic skills, a simple easy-to-use BASIC SKILLS CHECKLIST is provided with each subject area module. This Basic Skills Checklist will enable you as the Industrial Education Teacher to better identify those students in your classes who require additional help in the basic skills.

Additionally, a BASIC SKILLS VERIFICATION FORM is provided which will enable you to ask your school's reading resource teacher, basic skills teacher, math resource teacher, Hart Bill Conferencing teacher, or grade counselors, to verify your identification and provide you with help in the instruction of the basic skills.

You may wish to use these techniques as instruction for your entire class, or as a take-home, parent-involvement assignment. They may also be used in your school's reading or math lab or in conjunction with your school's basic skills instructional programs.

These instructional techniques are successful because your students are able to relate reading, writing, math, verbal and visual communication to their own industrial education classes. When your students succeed, they feel good about themselves, good about their schools, and good about their future.

Name _____

CONFIDENTIAL Grade _____ Class _____

Date _____

## BASIC SKILLS CHECKLIST (METALS)

*The following is a list of the basic skills (reading, writing, math, verbal and visual communication) that the student should demonstrate an ability in for the purpose of employment or advanced training in the metals trade.*

1.0 Verbal Communication: The student needs additional instruction in verbal communication if any of the items below are checked NO:

1.1 Yes ____ The student understands verbal directions or information given by the teacher.

No ____

Example: The teacher informs the student that safety glasses are required when using the grinder. Does the student use safety glasses when required?

1.2 Yes ____ The student asks questions about instructions or information not understood.

No ____

Example: Did the student ask questions about the operation of a particular machine if it appears that he/she does not understand the instructions given?

1.3 Yes ____ The student is able to apply information and directions heard to work situations.

No ____

Example: After receiving instructions on the proper use of a machine, is the student able to have a basic understanding of its operation?

1.4 Yes ____ The student is able to verbally communicate with the teacher and other students.

No ____

Example: Is the student able to convey instructions/information to other students?

2.0 Writing: The student needs additional instruction in writing if any of the items below are checked NO:

2.1 Yes ____ The student is able to summarize and write a customer work order.

No ____

Example: A customer requests a certain type of welding job; is the student able to convey this request in writing on the job order form?

2.2 Yes ____ The student is able to communicate in writing instructions for a job to be performed.

No ____

Example: Is the student able to convey instructions to another student about a job to be performed at a later date?

3.0 Reading: The student needs additional instruction in reading if any of the items below are checked NO:

3.1 Yes ____ The student is able to read and understand job related materials.

No ____ Example: Is the student able to read and understand safety rules and warnings (including the shop safety test), job applications, job orders, and operating instructions for machines?

3.2 Yes ____ The student is able to follow step by step procedures listed on instructional/job sheets.

No ____ Example: Is the student able to perform tasks in a sequence after being given a demonstration and a procedure sheet to follow?

4.0 Math: The student needs additional instruction in math if any of the items below are checked NO:

4.1 Yes ____ The student is able to read a rule to increments of 1/16th inch.

No ____

4.2 Yes ____ The student is able to calculate the amount and size of material required to construct a project.

No ____ Example: Is the student able to calculate the amount and size of material required to build an engine stand?

4.3 Yes ____ The student can add and subtract fractions.

No ____ Example: Given metal to dimension, is the student able to add or subtract an amount of metal in order to achieve the correct size?

4.4 Yes ____ The student is able to read a micrometer, ruler, and vernier caliper.

No ____

4.5 Yes ____ The student is able to compute percentages and ratios.

No ____ Example: Is the student able to compute the amount of metal shrinkage, given the normal rate of shrinkage?

5.0 Visual Communication: The student needs additional instruction in visual communication if any of the items below are checked NO:

5.1 Yes ____ The student can understand working drawings and sketches.

No ____ Example: Can a student, given the necessary metal working tools and materials, construct a tool box from a drawing provided by the teacher.

IDENTIFICATION Made by: _____

## BASIC SKILLS VERIFICATION FORM

Student _____ Male____ Female____ Grade Level____

Teacher _____ Class_____ Date_____

The Basic Skills Check List (attached) for the above student indicates a need for instructional assistance in the basic skills (reading, writing, math, verbal or visual communication). The following verification and recommendations are made:

____Lacks Reading Skills

____Lacks Writing Skills

____Lacks Mathematical Skills

____Lacks Verbal Communication Skills

____Lacks Visual Communication Skills

### METHOD USED FOR VERIFICATION

Recent Test Scores:

| Test | Score | Date |
|---|---|---|
| | | |
| | | |
| | | |

Other Verification Methods:

_____

_____

### RECOMMENDATIONS

The following instructional assistance is recommended: _____

_____

Verification & Recommendations Made By: _____ Date: _____

Title: _____

_____

_____

### FOLLOW UP

Action Taken: _____

Results: ____Qualified for advanced training

____Qualified for employment in the trade

____Other_____

Certified by: _____ Date: _____
Teacher

# LEARNING TO SKETCH STRAIGHT LINES FOR THE METAL SHOP

(Visual Communication)

*Metals Verbal/Visual 1*

# LEARNING TO SKETCH STRAIGHT LINES FOR THE METAL SHOP

## TEACHER MATERIALS:

### 1. CONCEPTS OF TECHNIQUE:

a. What SKILL will this technique teach?

VISUAL COMMUNICATION: This technique will assist the student in learning to communicate with simple straight line sketching.

b. What student learning problem(s) prompted the development of this technique?

This technique was developed because of the inability of students to sketch objects using vertical, horizontal and diagonal lines.

### 2. TEACHER INSTRUCTIONS FOR THE USE OF THIS TECHNIQUE:

a. Identify students who need practice in sketching straight lines.

b. Take a few minutes to show students how to sharpen, hold, and use a pencil in sketching.

c. Provide the student with the assignment sheet on sketching and drawing. Explain the assignment and set a day for the return of the worksheets.

d. Collect and evaluate the students' work. If additional practice is needed, have the student repeat the assignment or assign a similar assignment.

NOTE: This assignment can be given during class or as homework.

### 3. SUGGESTED RELATED ACTIVITIES:

You may wish to encourage your students to continue to practice their sketching by selecting other objects to sketch or by assisting other students with their sketching.

# LEARNING TO SKETCH STRAIGHT LINES FOR THE METAL SHOP

## STUDENT MATERIALS:

### 1. STUDENT INSTRUCTIONS:

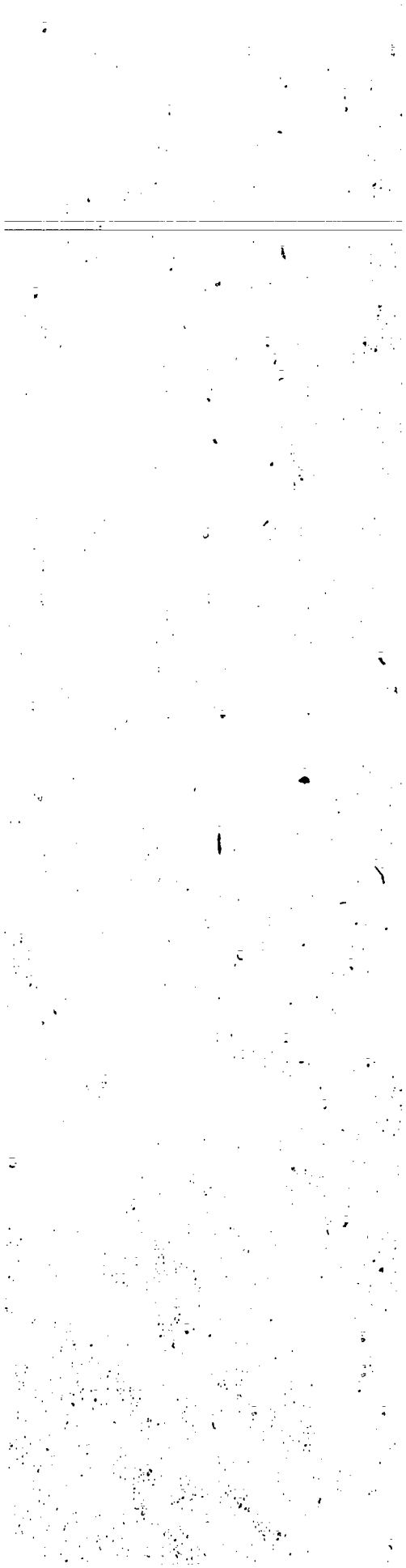
a. The purpose of this assignment is to help you learn how to sketch straight lines. Attached is a practice sketching assignment. The boxes on the left hand side of the sheet have sets of lines that you are to copy and sketch in the boxes on the right.

### 2. STUDENT ASSIGNMENT:

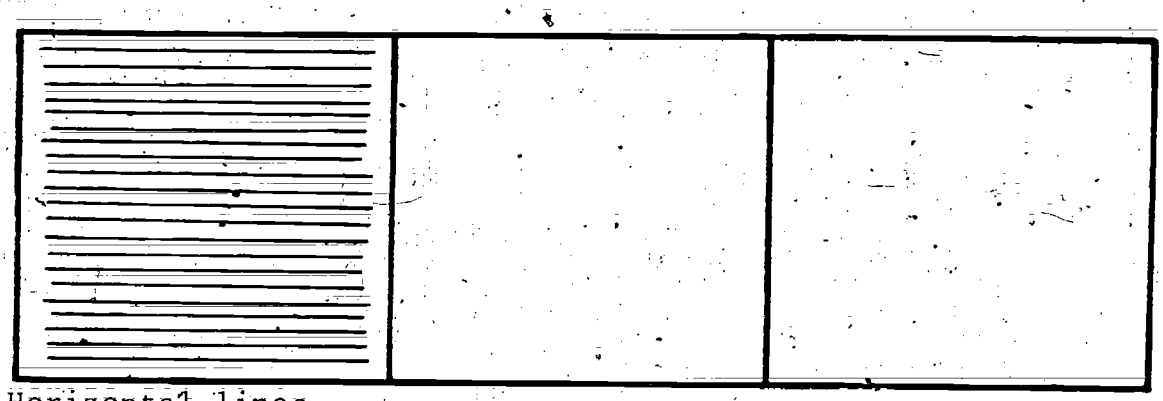
Your assignment is found on STUDENT PAGES 2 - 7.

### 3. EXTRA THINGS THAT YOU CAN DO:

After you learn how to sketch straight lines, you should continue your practice by sketching projects and helping other students to learn how to sketch.

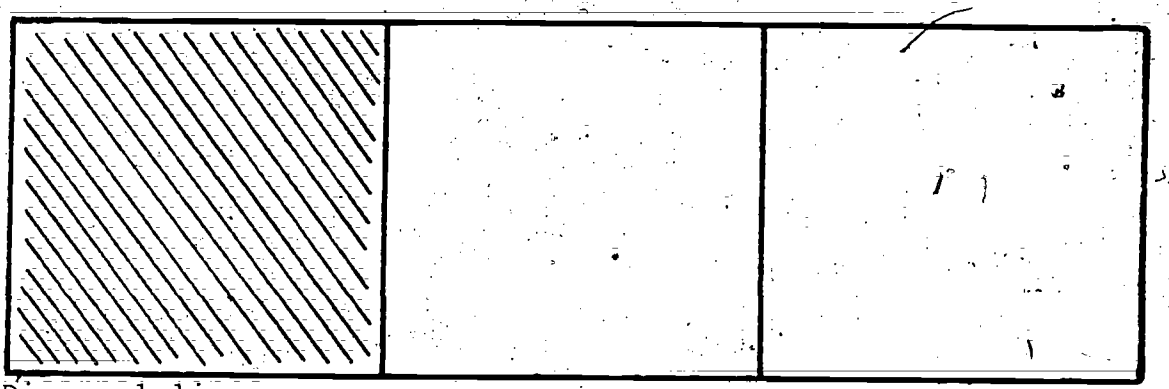


INSTRUCTIONS: Fill in the empty boxes by sketching and labeling what you see in the boxes on the left.



Horizontal lines

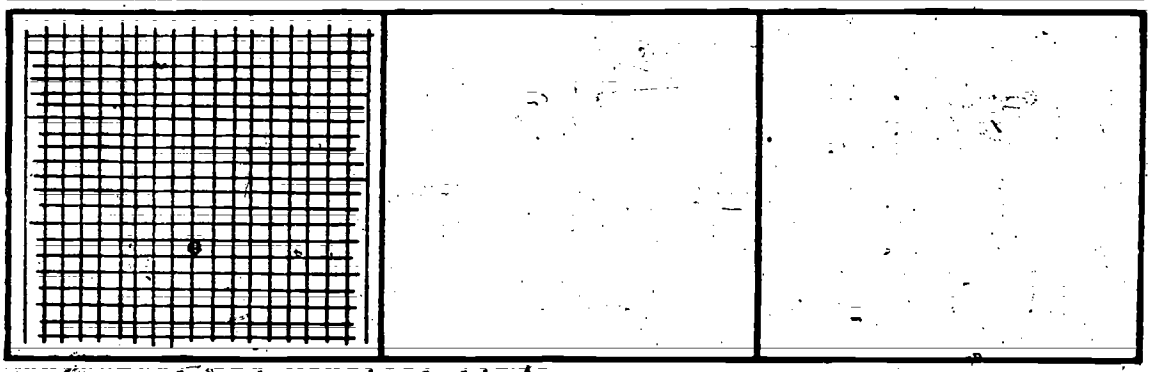
Vertical lines



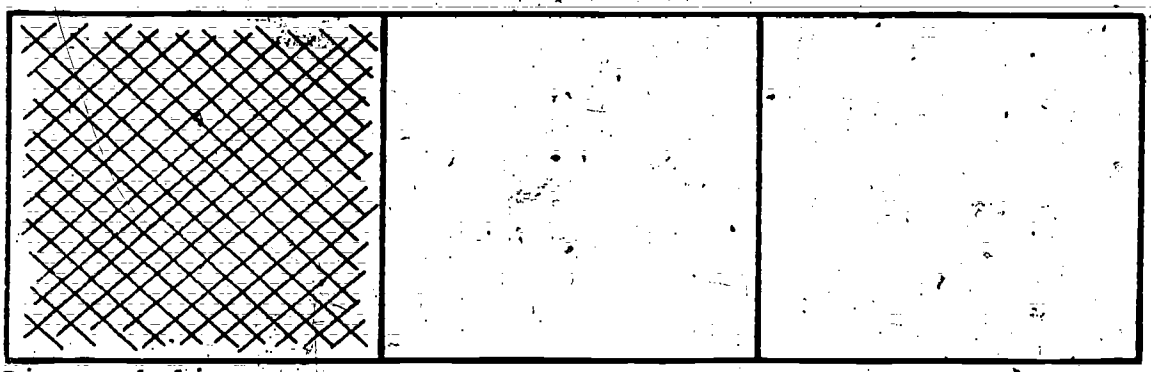
Diagonal lines

Diagonal lines

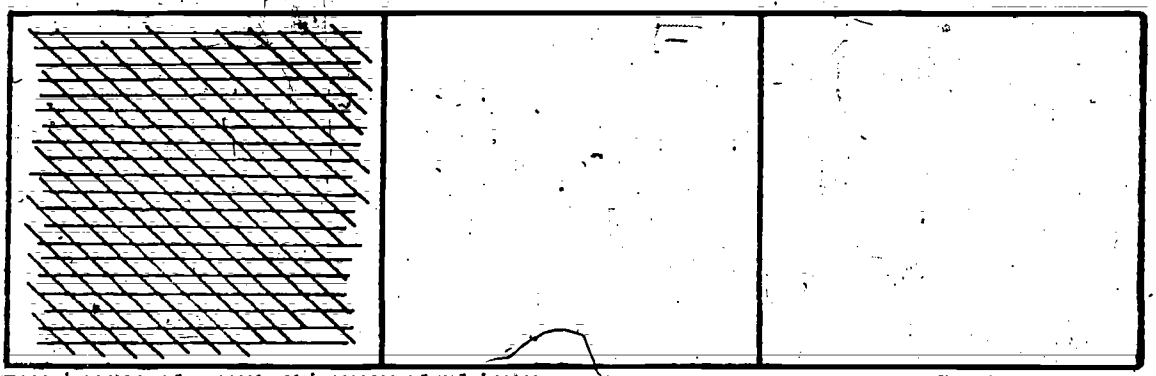
INSTRUCTIONS: Fill in the empty boxes by sketching and labeling what you see in the boxes on the left.



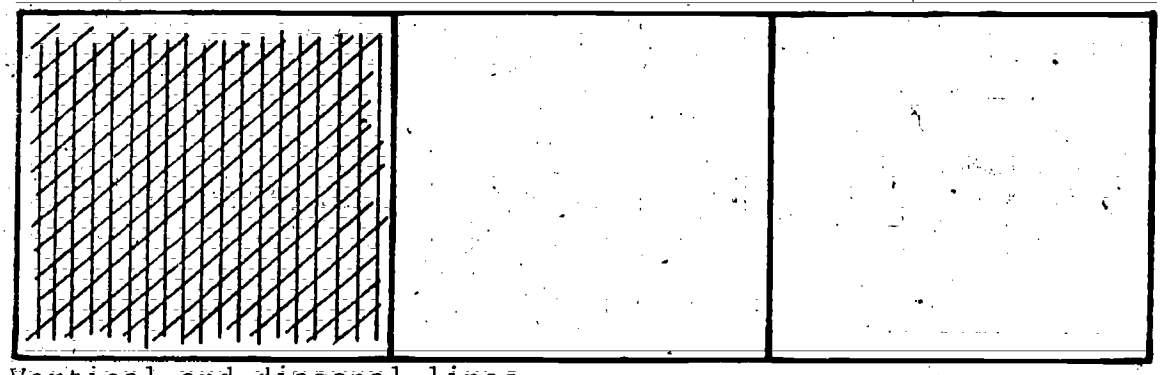
Horizontal and vertical lines



Diagonal lines

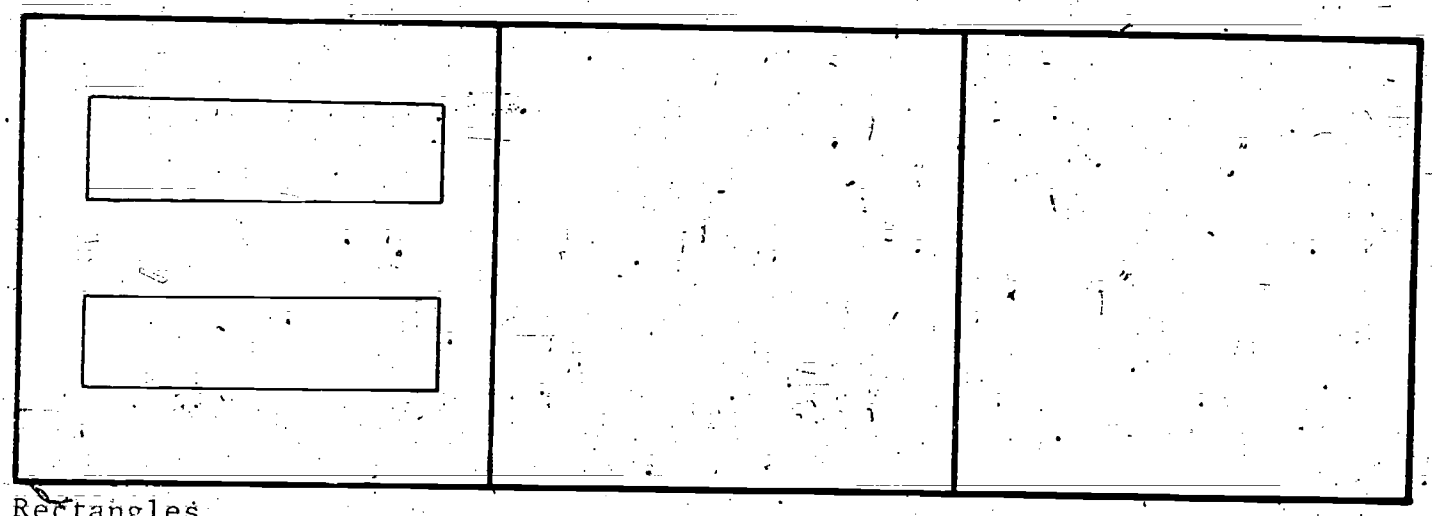


Horizontal and diagonal lines

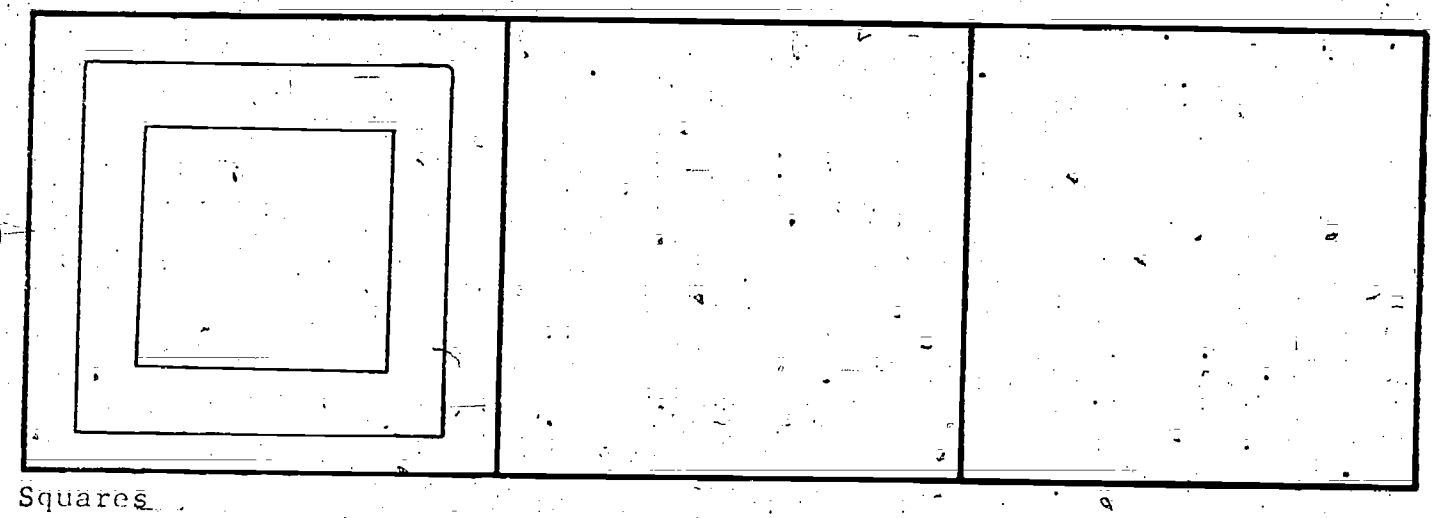


Vertical and diagonal lines

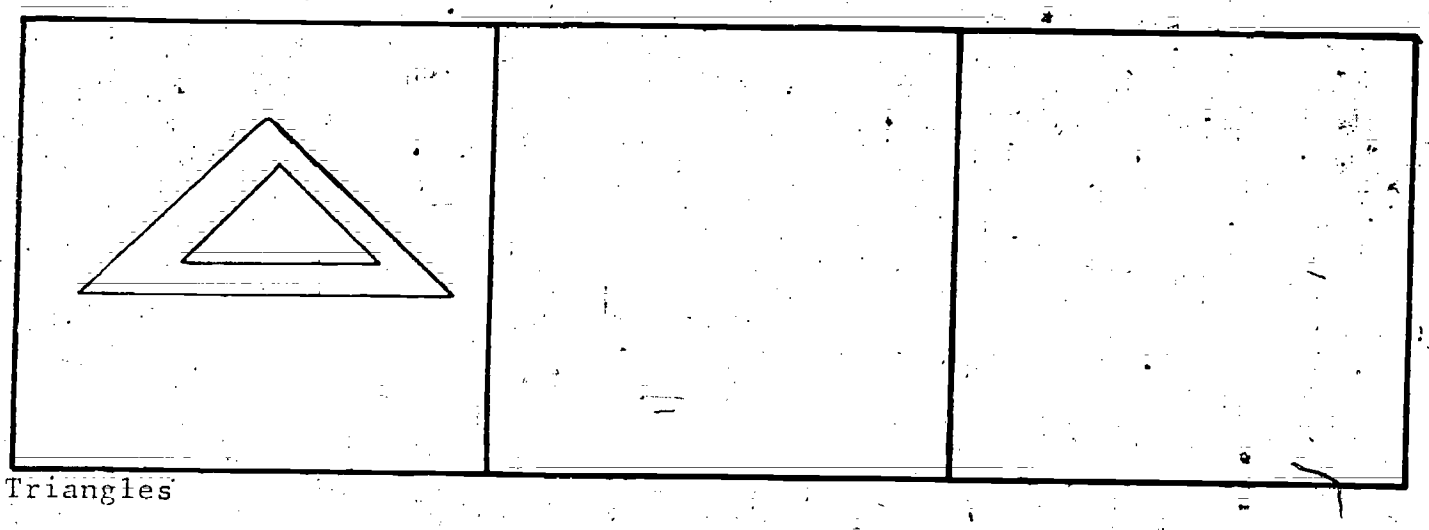
INSTRUCTIONS: Fill in the empty boxes by sketching and labeling what you see in the boxes on the left.



Rectangles

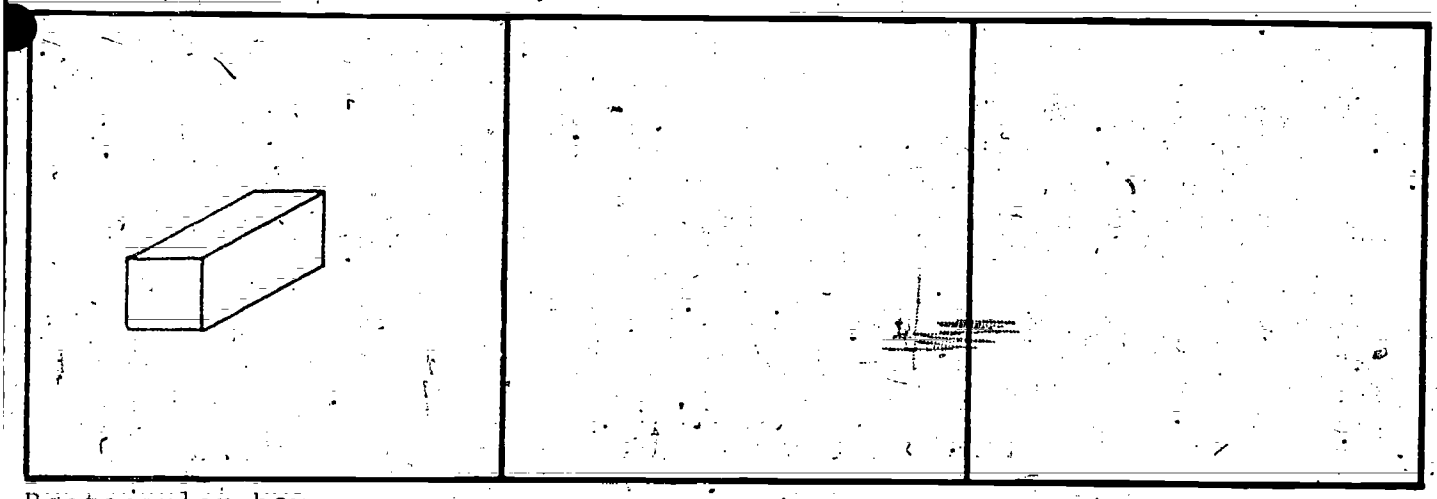


Squares

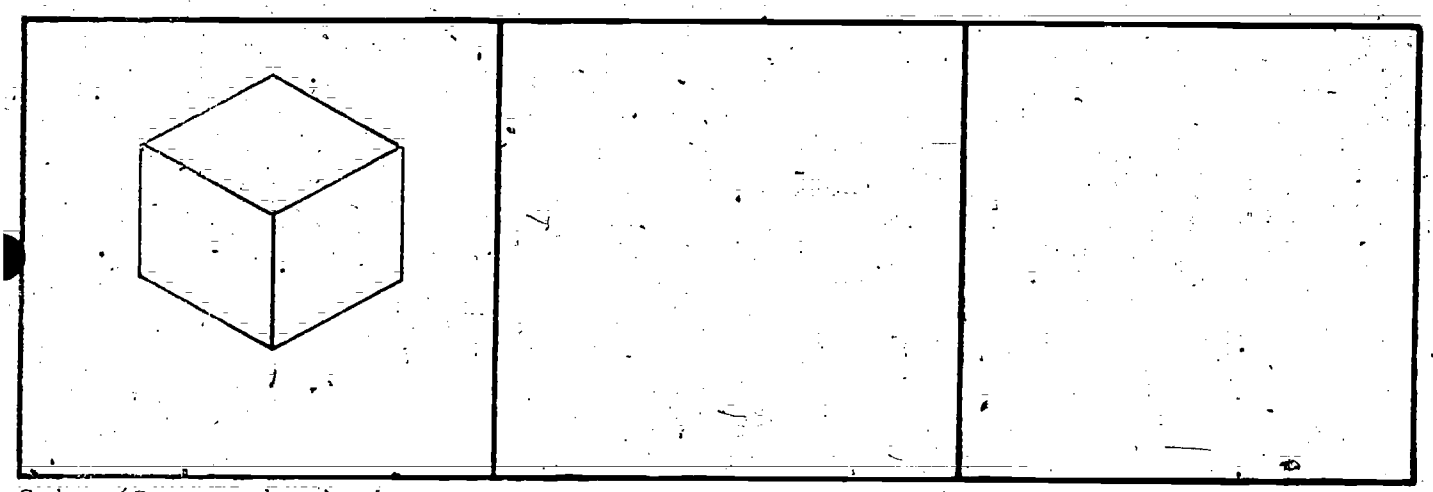


Triangles

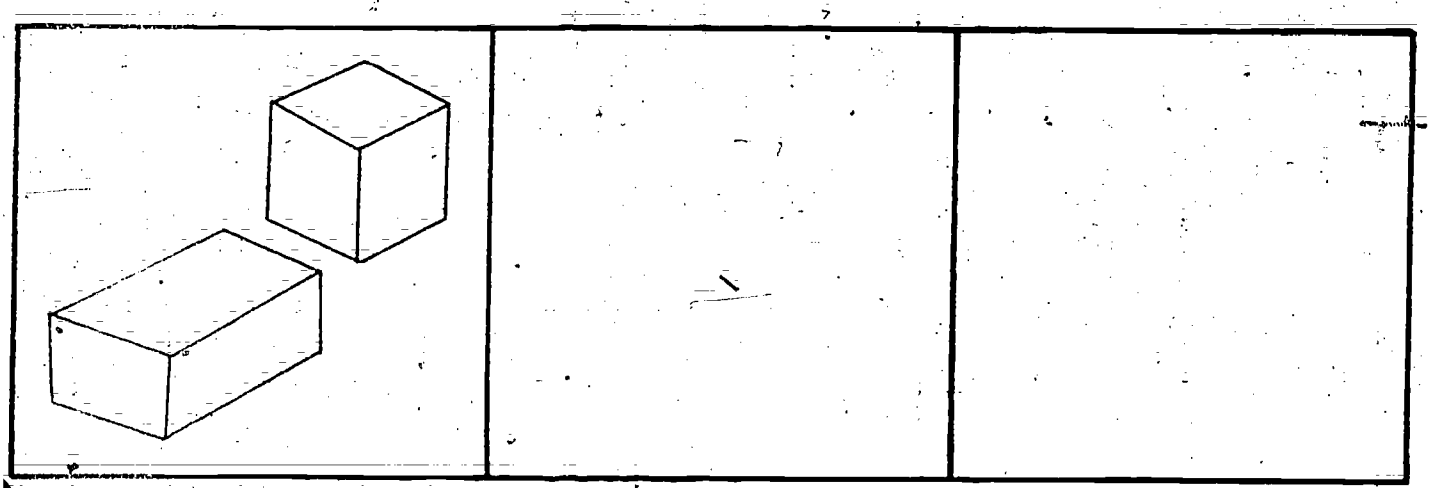
INSTRUCTIONS: Fill in the empty boxes by sketching and labeling what you see in the boxes on the left.



Rectangular box

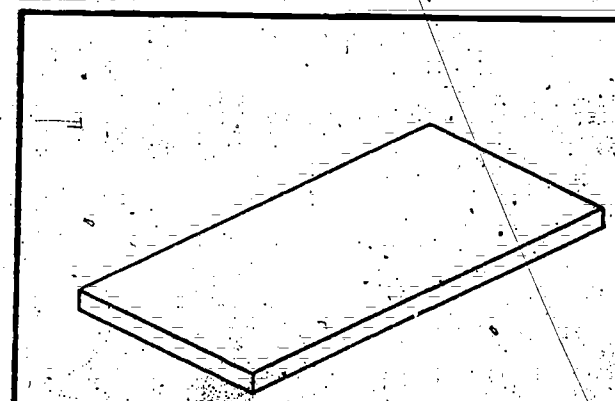


Cube (Square box)

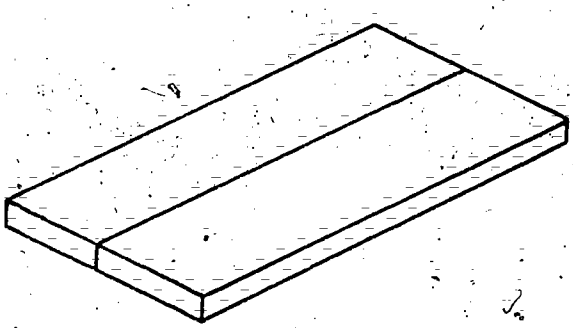


Rectangular box and cube

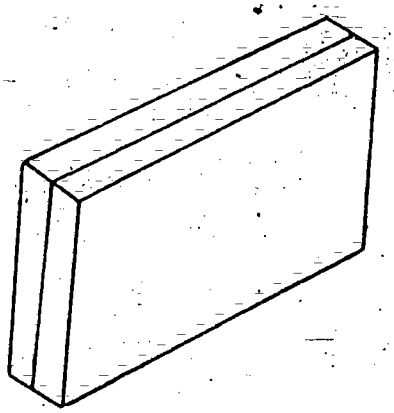
INSTRUCTIONS: Fill in the empty boxes by sketching and labeling what you see in the boxes on the left.



Sheet steel

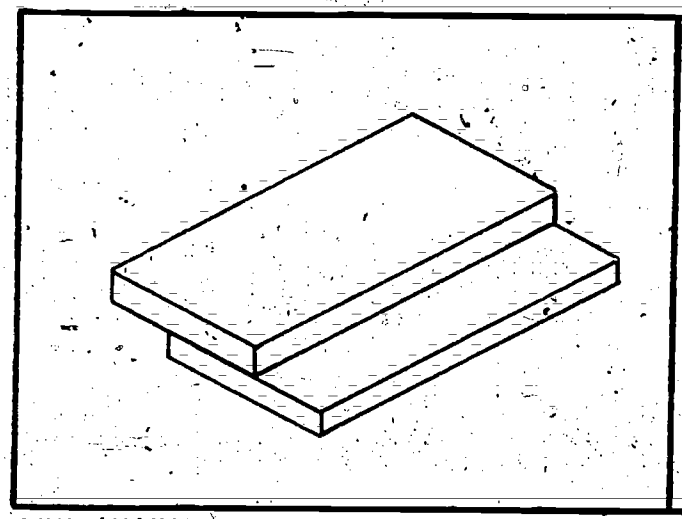


Butt joint

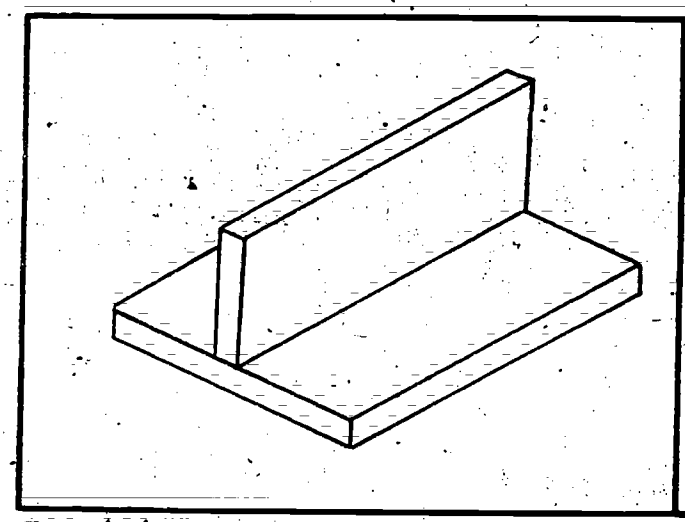


Edge joint

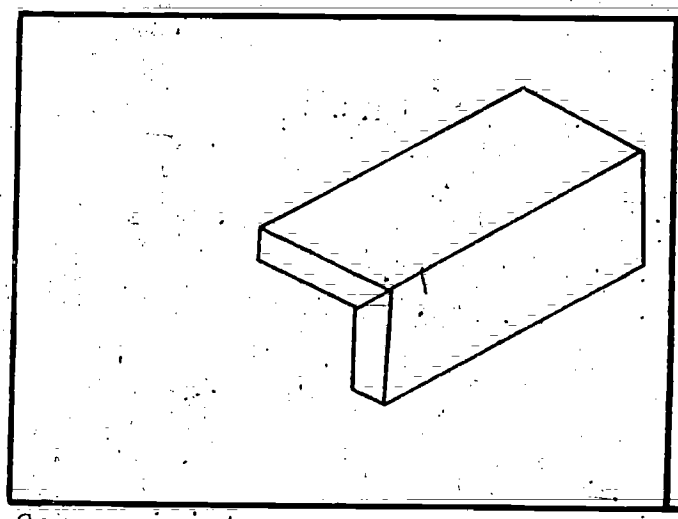
INSTRUCTIONS: Fill in the empty boxes by sketching and labeling what you see in the boxes on the left.



Lap joint



Tee joint



Corner joint

# SKETCHING CURVED AND IRREGULAR LINES

# IN THE METAL SHOP

(Visual Communication)

*Metals: Verbal/Visual 2*

# SKETCHING CURVED AND IRREGULAR LINES IN THE METAL SHOP

## TEACHER MATERIALS:

### 1. CONCEPTS OF TECHNIQUE:

a. What SKILL will this technique teach?

VISUAL COMMUNICATION: This technique will assist the student in learning to communicate with simple sketching that involves curved and irregular lines.

b. What student learning problem(s) prompted the development of this technique?

This technique was developed because of the inability of some students to sketch objects with curved and irregular lines.

### 2. TEACHER INSTRUCTIONS FOR THE USE OF THIS TECHNIQUE:

a. Identify students who need practice in sketching curved and irregular lines.

b. Take a few minutes to show students how to sharpen, hold, and use a pencil in sketching.

c. Provide the student with the assignment sheet on sketching. Explain the assignment and set a date for the return of the worksheet.

d. Collect and evaluate the students' work. If additional practice is needed, have the students repeat the assignment or provide a similar assignment for additional practice.

NOTE: This assignment can be given during class or as homework.

### 3. SUGGESTED RELATED ACTIVITIES:

You may wish to encourage your students to continue to practice their sketching by selecting other objects to sketch or by assisting other students with their sketching.

# SKETCHING CURVED OR IRREGULAR LINES IN THE METAL SHOP

## STUDENT MATERIALS:

### 1. STUDENT INSTRUCTIONS:

a. The purpose of this assignment is to help you to learn how to sketch. Attached is a practice sketching assignment. The boxes on the left side of the sheet have sets of lines that you are to copy and sketch in the boxes on the right.

### 2. STUDENT ASSIGNMENT:

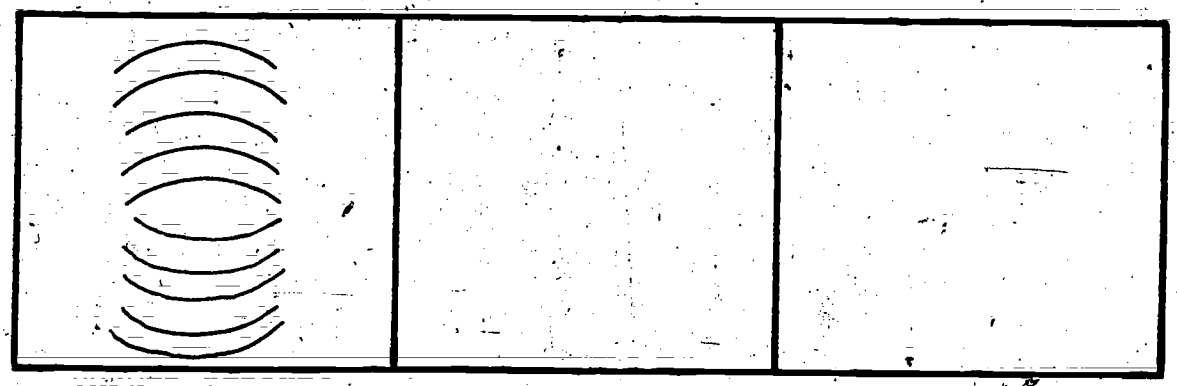
Your assignment is found on STUDENT PAGES 2 - 5.

### 3. EXTRA THINGS THAT YOU CAN DO:

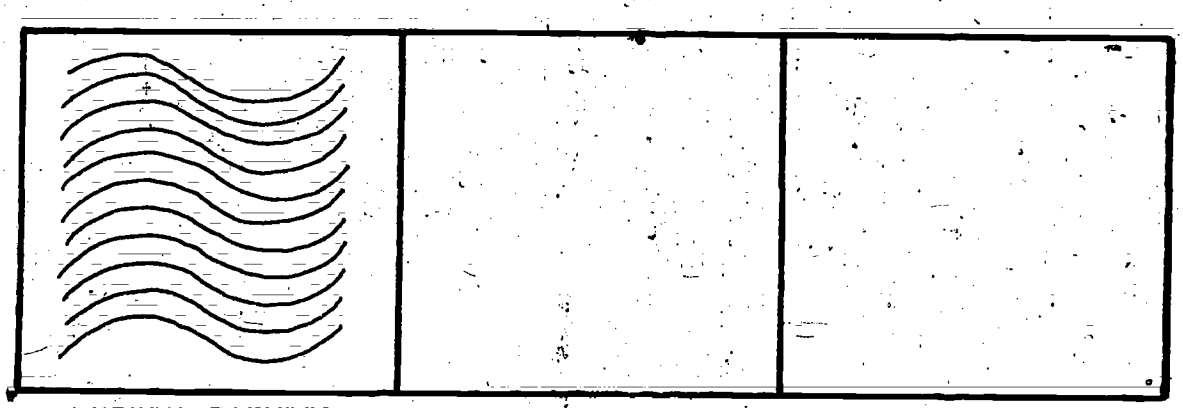
After you learn how to sketch curved and irregular lines, you should continue to practice your sketching by drawing metal projects and by helping other students in learning how to sketch.

INSTRUCTIONS: Fill in the empty boxes by sketching and labeling what you see in the boxes on the left.

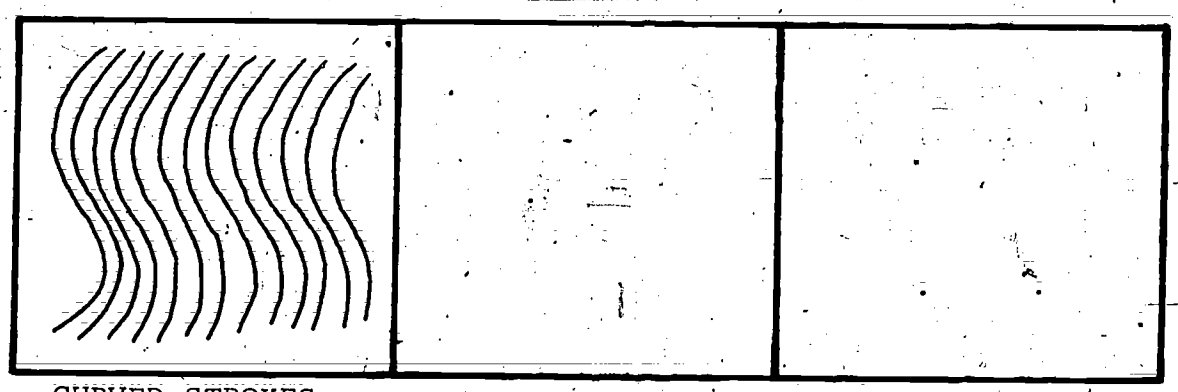
CURVED STROKES



CURVED STROKES



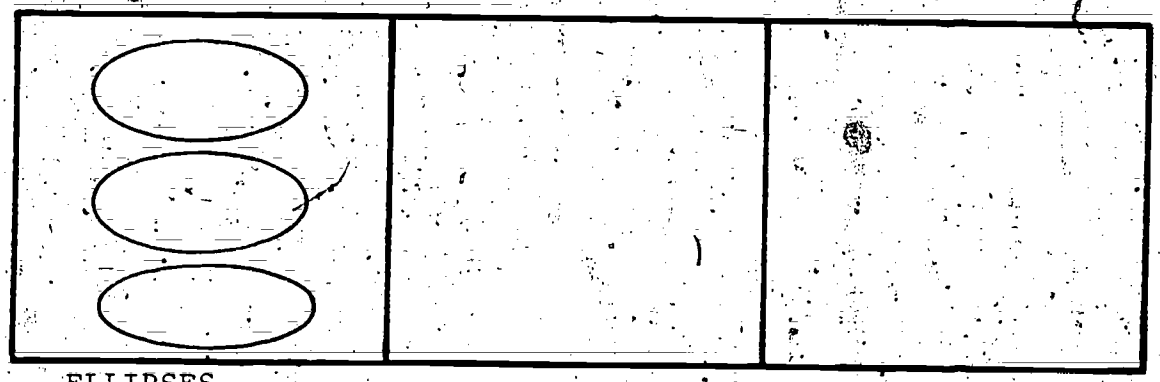
CURVED STROKES



CURVED STROKES

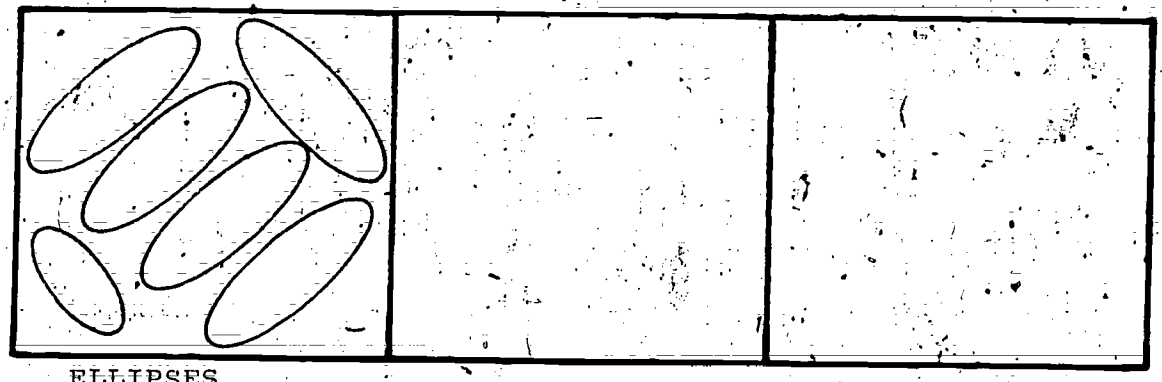
INSTRUCTIONS: Fill in the empty boxes by sketching and labeling what you see in the boxes on the left.

CIRCLES



ELLIPSES

ELLIPSES



ELLIPSES

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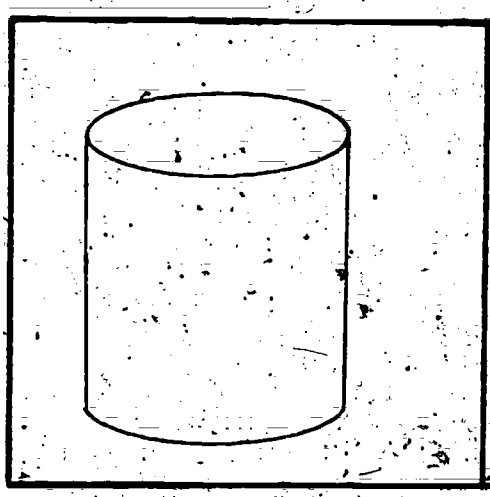
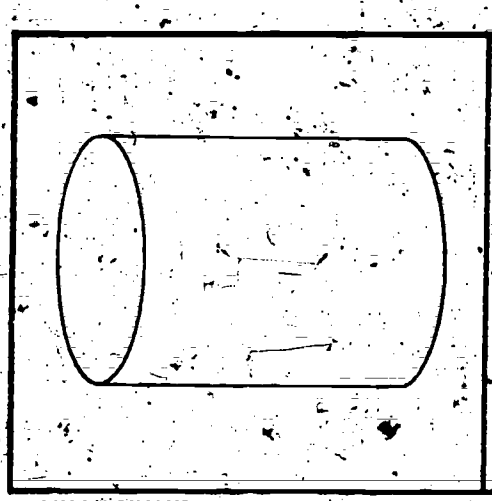
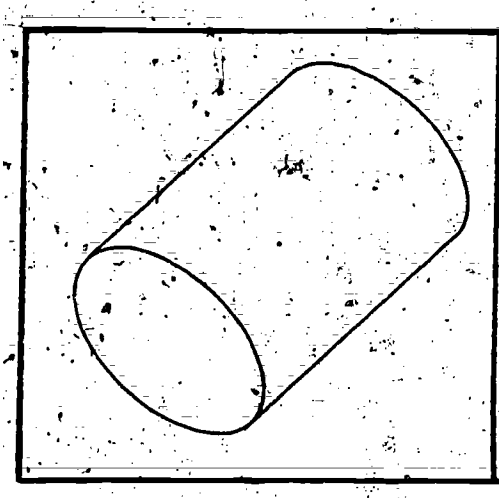


CYLINDER

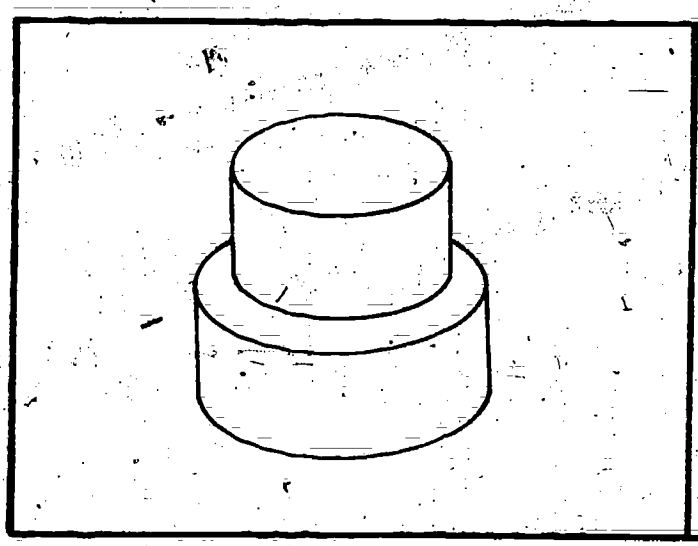


CYLINDER

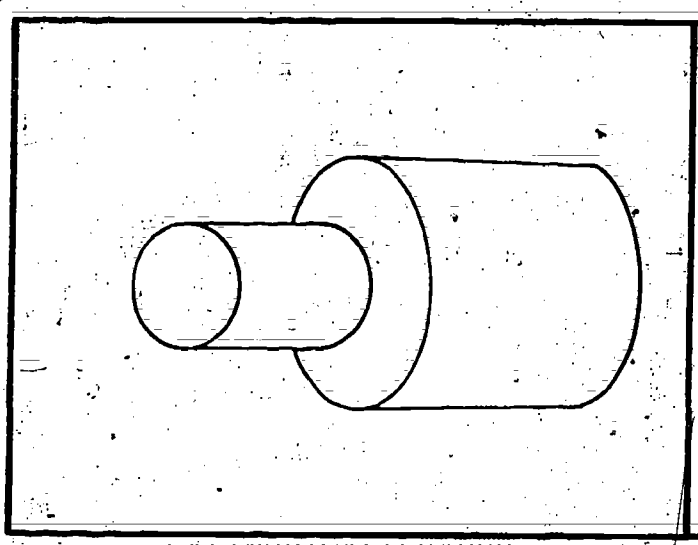


CYLINDER

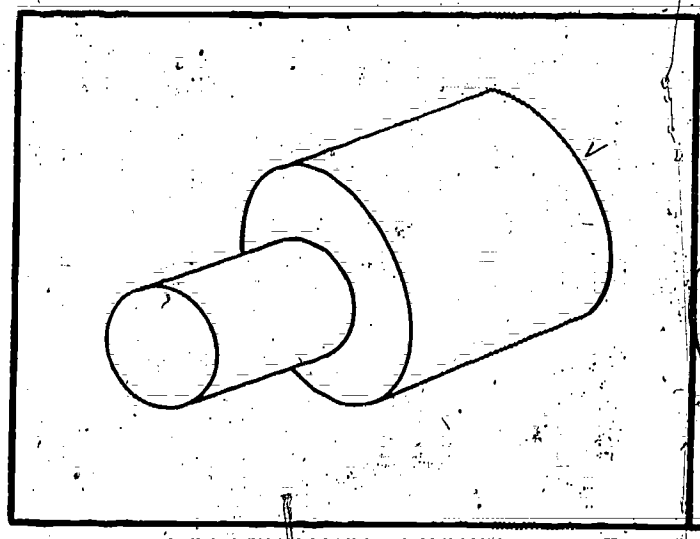
INSTRUCTIONS: Fill in the empty boxes by sketching and labeling what you see in the boxes on the left.



CYLINDRICAL SHAPES



CYLINDRICAL SHAPES



CYLINDRICAL SHAPES

# SELECTING THE RIGHT TOOL

(Verbal Communication)

*Metals . Verbal/Visual 3*

# SELECTING THE RIGHT TOOL

## TEACHER MATERIALS:

### 1. CONCEPTS OF TECHNIQUE:

a. What SKILL will this technique teach?

1. Verbal communication
2. Listening skills

b. What student learning problem(s) prompted the development of this technique?

Many students do not know the names of common metalworking tools. This technique will develop skills that will help the student to remember metalworking tools.

### 2. TEACHER INSTRUCTIONS FOR THE USE OF THIS TECHNIQUE:

a. Select a student at random while the class is working.

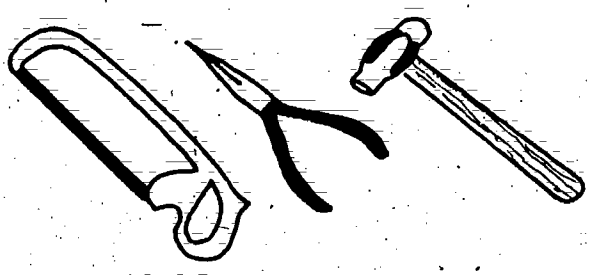
b. Tell the student to go to the tool panel and obtain several hand tools as quickly as possible.

c. Grade the student according to how fast and accurately he/she identifies the tools.

### 3. SUGGESTED RELATED ACTIVITIES:

This technique could also be used to help your students identify the names of equipment.

# SELECTING THE RIGHT TOOL



## STUDENT MATERIALS:

## 1. STUDENT INSTRUCTIONS:

a. When the teacher calls you, go quickly to his/her desk.

b. The teacher will ask you to go to the tool panel as quickly as you can and select several hand tools you should be familiar with. Return to the teacher with the proper tools.

c. Talk to no one while going to and returning from the tool panel.

## 2. STUDENT ASSIGNMENT:

Your teacher will ask you to pick up selected tools from the tool panel.

## 3. EXTRA THINGS THAT YOU CAN DO:

Volunteer to be the shop tool checker. This will help you learn the names of the tools faster.

# Learning The Names Of Tools In The Metal Shop With Flash Cards

(Verbal Communication)

*Metals Verbal/Visual 4*

# LEARNING THE NAMES OF TOOLS IN THE METAL SHOP

# WITH FLASH CARDS

## TEACHER MATERIALS:

### 1. CONCEPTS OF TECHNIQUE:

a. What SKILL will this technique teach?

VERBAL COMMUNICATION: This technique will help students develop verbal communication skills while learning to identify and pronounce the names of hand tools.

b. What student learning problem(s) prompted the development of this technique?

Although some students can select and use hand tools, they cannot ask for them by name.

### 2. TEACHER INSTRUCTIONS FOR THE USE OF THIS TECHNIQUE:

a. Select twenty metal shop hand tools that you want your students to learn the names of. Obtain pictures of the tools, paste them up on a piece of paper (get as many on one sheet as possible), and offset enough copies for your class.

b. Team your students in groups of four and give each group one copy of the set of hand tools.

c. Have each group cut up the pictures of tools and paste them on 3 x 5 cards and write the name of the tool on the back of the card.

d. Have the students punch a hole in each card and hang them as a group (twenty) on a metal ring.

e. Tell the students to practice and test each other with the flash cards until every student in the group can identify the tools.

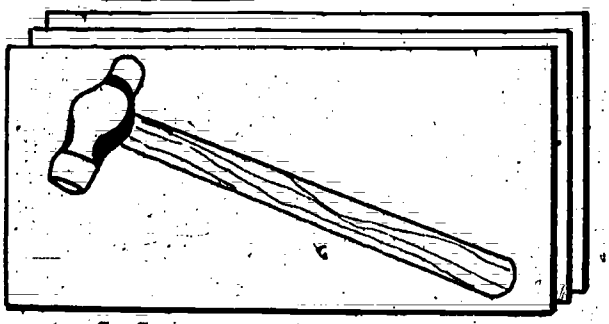
f. When a group feels that they have learned the names of the tools have them take a test (oral or written). Individuals in the group who fail the test can take the flash cards home to practice.

### 3. SUGGESTED RELATED ACTIVITIES:

If this technique works for your students, you may want to use it to help them learn about other tools.

# LEARNING THE NAMES OF TOOLS IN THE METAL SHOP

## WITH FLASH CARDS



## STUDENT MATERIALS:

### 1. STUDENT INSTRUCTIONS:

a. You have been assigned to a group of four students. You will help each other learn to identify and name twenty hand tools.

b. Each group is to take one copy of the set of hand tools.

c. Each student will take the pictures of five tools, cut them out, paste them on a 3 x 5 card, and write the name of the tool on the back. Use a class textbook to find the names of the tools and be sure to spell the names correctly.

d. Punch a hole in the top of each card and have each member of your group slip their cards on a metal ring provided by the instructor.

e. Each group will have twenty cards on a metal ring and can begin practicing the names of the tools.

### 2. STUDENT ASSIGNMENT:

a. Each student in the group is to take their turn in learning the names of the tools.

b. One student in the group will hold the ring of cards flipping them over while another student names the tool.

c. When a student names a tool incorrectly or fails to name the tool at all, the student holding the cards will read the correct answer.

d. When the group as a whole feels that everyone in the group has learned the names of the tools, tell the instructor.

e. The instructor will give each of the students a hand tool identification test. Students who are not able to pass the test will be given a set of flash cards to take home to practice and will be tested again.

### 3. EXTRA THINGS THAT YOU CAN DO:

You can use this assignment as a learning tool in other classes.

# METALSHOP BINGO

(Verbal Communication)

*Metals Verbal/Visual 5*

# METALSHOP BINGO

## TEACHER MATERIALS:

### 1. CONCEPTS OF TECHNIQUE:

a. What SKILL will this technique teach?

This technique will teach the skill of VERBAL COMMUNICATION.

b. What student learning problem(s) prompted the development of this technique?

This technique was developed because students have difficulty identifying metalworking equipment and discussing the function and use of the equipment.

### 2. TEACHER INSTRUCTIONS FOR THE USE OF THIS TECHNIQUE:

a. Make a label and 35mm slide for each piece of equipment in the metalshop.

b. Place the label on each piece of equipment in the shop and put the slides in a projector in random order. (Use stack loader on a carousel projector rather than a tray.)

c. Give the students a Metalshop Bingo Card and have them walk around the shop writing the names of each piece of equipment in the squares on their card.

d. Have the students take their seats and begin showing the slides. As each piece of equipment is flashed on the screen, select a student to name the piece of equipment and discuss its use.

e. After a piece of equipment is named, each student places an an "X" in the square where the name of that equipment was written. The student getting five in a row (BINGO) wins the game. The slides can be shuffled, placed in the projector and the game played again until the instructor feels the students have had enough practice naming and discussing the equipment.

### 3. SUGGESTED RELATED ACTIVITIES:

Use other games to help students learn the names of tools and equipment.

# METALSHOP BINGO

## STUDENT MATERIALS:

### 1. STUDENT INSTRUCTIONS:

a. Obtain a Metalshop Bingo Card from your instructor. Walk around the shop, look for the label on each piece of equipment and write the names in the empty squares on your card until all the squares are filled.

b. When all the squares on your card are filled, take your seat. Discuss with other students the usage of unfamiliar equipment.

c. The instructor will show a slide of each piece of equipment and ask a student to identify and discuss it. As each piece of equipment is shown on the screen, place an "X" in the square with that name.

d. The first person to get five in a row gets "BINGO" and wins the game. The game may be played over and over again until the teacher feels the students know the names and use of each piece of equipment.

### 2. STUDENT ASSIGNMENT:

Your instructions for playing Metalshop Bingo and your Metalshop Bingo Card are found on STUDENT PAGE 2.

### 3. EXTRA THINGS THAT YOU CAN DO:

Think of other games that can be used to help students learn the names of tools and equipment.

# METALSHOP BINGO CARD

INSTRUCTIONS: The purpose of this assignment is to help you learn the name and usage of each piece of equipment in the metalshop.

1. Walk around the shop writing the names of the pieces of equipment in the empty squares on this card (one name per square).
2. If you don't know the use of a piece of equipment, discuss it with someone in the class or look it up in one of the textbooks.
3. When you have filled all of the squares, take your seat.
4. As each piece of equipment is named and discussed, place and "X" in the square where you have written that name.
5. The person who gets five squares in a row (BINGO) wins the game.

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# KNOWING THE PARTS OF A LATHE

(Visual Communication)

*Metals Verbal/Visual 6*

# KNOWING THE PARTS OF A LATHE

## TEACHER MATERIALS:

### 1. CONCEPTS OF TECHNIQUE:

a. What SKILL will this technique teach?

1. Specialized vocabulary
2. Visual communication skills

b. What student learning problem(s) prompted the development of this technique?

This technique was developed because students are unable to identify important parts of the lathe.

### 2. TEACHER INSTRUCTIONS FOR THE USE OF THIS TECHNIQUE:

a. Use this worksheet after completing the introduction to the lathe. Teaching safety will be easier if you complete this worksheet first.

b. Stress the importance of being able to identify the parts by the proper name.

c. Use the money pyramid to motivate the student into finishing this worksheet (see who can make the most money).

ANSWERS:

1. Motor drive in leg
2. Power switch
3. Gear box
4. Feed reverse lever
5. Headstock
6. Apron
7. Tool post
8. Feed change lever
9. Compound rest
10. Half nut lever
11. Saddle
12. Tailstock
13. Bed
14. Lead screw

### 3. SUGGESTED RELATED ACTIVITIES:

Put stick-on numbers directly on lathe parts and have students identify and write each part name down on paper.

# KNOWING THE PARTS OF A LATHE

## STUDENT MATERIALS:

### 1. STUDENT INSTRUCTIONS:

a. Your instructor will explain the operation of a lathe to you. You will be given a worksheet.

b. On the worksheet, starting with number 1, identify each part on the lathe drawing. Look at the list of parts.

c. Write the correct part name in the box of the pyramid which corresponds with the part on the lathe.

d. Make the most money by filling in the entire pyramid. Only the correct answer makes money.

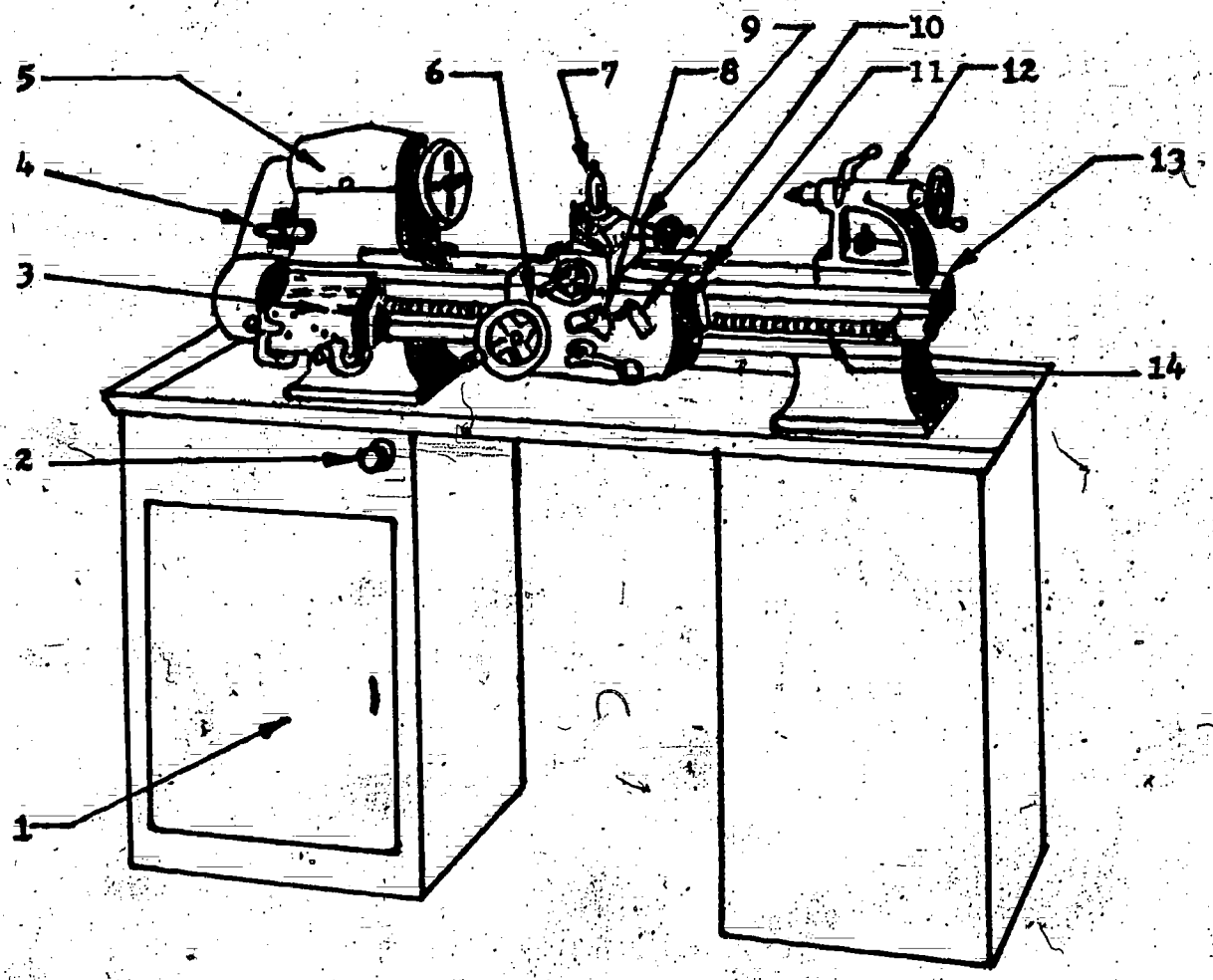
### 2. STUDENT ASSIGNMENT:

Your assignment is found on STUDENT PAGE 2.

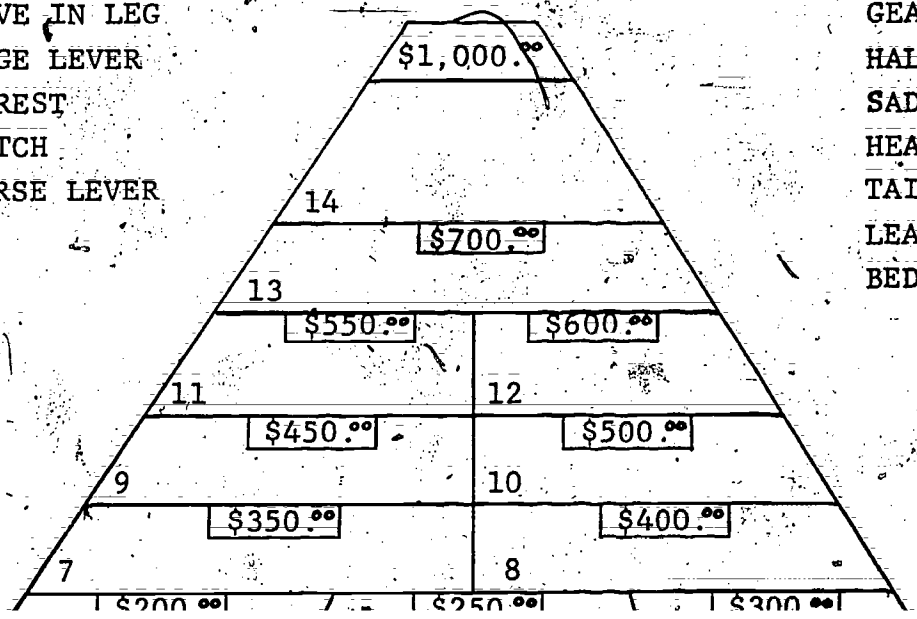
### 3. EXTRA THINGS THAT YOU CAN DO:

See if you can name the parts of other metal working machines.

# KNOWING THE PARTS OF A LATHE




MOTOR DRIVE IN LEG
FEED CHANGE LEVER
COMPOUND REST
POWER SWITCH
FEED REVERSE LEVER
TOOL POST
APRON




GEAR BOX
HALF NUT LEVER
SADDLE
HEADSTOCK
TAILSTOCK
LEAD SCREW
BED

# Demonstrating Machine Operations To The Instructor

(Verbal Communication)

*Metals Verbal/Visual 7*

# DEMONSTRATING MACHINE OPERATIONS TO THE INSTRUCTOR

## TEACHER MATERIALS:

### 1. CONCEPTS OF TECHNIQUE:

a. What SKILL will this technique teach?

VERBAL COMMUNICATION: This technique will assist the student in learning to verbally communicate with the teacher.

b. What student learning problem(s) prompted the development of this technique?

This technique was developed because of the inability of some students to communicate with the instructor.

### 2. TEACHER INSTRUCTIONS FOR THE USE OF THIS TECHNIQUE:

a. Identify students who have difficulty communicating verbally with the instructor.

b. Ask the student to demonstrate to the teacher how to perform a basic operation on a machine (example: operating a drill press).

c. Provide the student with a "MACHINE SAFETY DEMONSTRATION" assignment card and set a date for the demonstration.

d. Review with the student the information needed and questions to be asked by the instructor.

e. Provide the student with the needed resources (reading assignment, information sheet, etc.).

f. The student will complete assignment by demonstrating and explaining verbally to the teacher how to perform the assigned operation.

### 3. SUGGESTED RELATED ACTIVITIES:

Students can strengthen their ability to communicate verbally by giving the same demonstration to new students or students not performing the operation correctly.

# DEMONSTRATING MACHINE OPERATIONS

## TO THE INSTRUCTOR

### STUDENT MATERIALS:*

### 1. STUDENT INSTRUCTIONS:

a. You will demonstrate to the teacher the safe use of the _____(machine).

b. The operation you will perform is _____

c. Use available reading materials in the classroom, from the library or from home. You will need to know vocabulary, safety rules and the operation to be performed.

d. An assignment card will be given to you by the instructor. Fill it out and use it as a reference during your demonstration. The instructor will review the information on the card prior to the demonstration.

### 2. STUDENT ASSIGNMENT:

a. Prior to giving your demonstration to the teacher, practice with one of your parents at home or one of the other metalworking students.

b. The grade you receive will be based on:

1. Your ability to answer these questions:

a. What is the name of the machine you are using?

b. What is the name of the operation to be performed?

c. What are the safety rules for the machine?

2. Your ability to use the machine.

3. Your ability to explain to the teacher what you are doing.

### 3. EXTRA THINGS THAT YOU CAN DO:

a. You may want to show new students how to use the machine.

b. You may want to assist students in the class who are not using the machine correctly.

## SAMPLE ASSIGNMENT CARD

FRONT

### MACHINE SAFETY DEMONSTRATION

Student's name _____ Period _____

Date of Demonstration _____

Machine name _____

Operation _____

Notes: _____

BACK

### SAFETY RULES:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

# MODEL MAKING

(Visual Communication)

*Metals Verbal/Visual 8*

# MODEL MAKING

## TEACHER MATERIALS:

### 1. CONCEPTS OF TECHNIQUE:

a. What SKILL will this technique teach?

VISUAL COMMUNICATION: This technique will help the student visualize three-dimensional products from two-dimensional drawings.

b. What student learning problem(s) prompted the development of this technique?

This technique was developed because of the inability of some students to understand the relationship between drawings and manufactured products.

### 2. TEACHER INSTRUCTIONS FOR THE USE OF THIS TECHNIQUE:

a. Assign students to produce a styrofoam model of an object they have drawn.

b. Inexpensive supplies and tools are easily obtained:

1. 3/4" styrofoam (insulation or packaging material).
2. Coping saw blades or band saw blades (6-8" long and taped at one end for a handle.)
3. Sand Paper
4. Glue

c. A portable vacuum cleaner is recommended for clean-up.

d. Full scale models can be made of small products. Large and more advanced models should be scaled down.

e. Explain to students the importance of models being made to accurate scale.

### 3. SUGGESTED RELATED ACTIVITIES:

The student can repeat this assignment and further reinforce his ability to visually understand drawings by making models from more advanced drawings.

# MODEL MAKING

## STUDENT MATERIALS:

### 1. STUDENT INSTRUCTIONS:

a. Draw the layout on the styrofoam model before cutting it.

b. Use a coping saw and carefully cut the lines you have drawn.

c. Sand all sides with fine sandpaper.

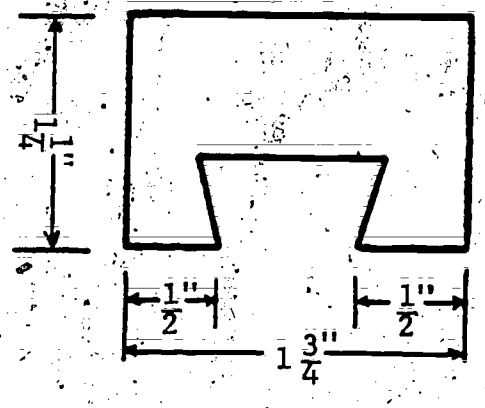
### 2. STUDENT ASSIGNMENT:

a. Your assignment is to make a styrofoam model from a drawing. A sample drawing is found on STUDENT PAGE 2.

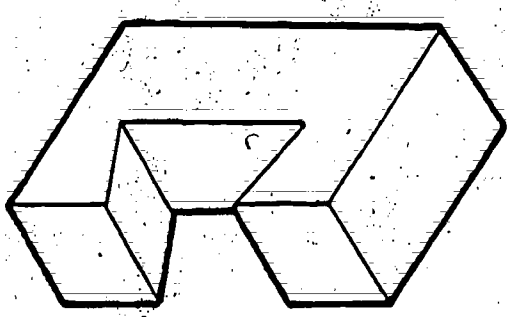
### 3. EXTRA THINGS THAT YOU CAN DO:

You may wish to repeat this assignment for extra credit or with more advanced products.

# MODEL MAKING







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